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### AMENDMENTS TO THE CLAIMS

1. (original) A biochip comprising:
  - a) a solid substrate having a surface;
  - b) at least one optically clear hydrogel cell attached to the surface of the substrate, which hydrogel cell is formed from an isocyanate-functional polymer; and
  - c) a binding entity immobilized within or upon said hydrogel cell, which entity is effective to selectively hybridize to or sequester a target molecule.
2. (original) The biochip of claim 1 wherein the hydrogel comprises a polymer with urethane linkages.
3. (original) The biochip of claim 1 wherein the hydrogel comprises polyethylene glycol, polypropylene glycol, or copolymers thereof.
4. (original) The biochip of claim 1 wherein the hydrogel cell is at least 20  $\mu\text{m}$  thick.
5. (original) The biochip according to claim 4, wherein the hydrogel cell is between about 30  $\mu\text{m}$  and about 100  $\mu\text{m}$  thick.

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6. (original) The biochip according to claim 1, wherein said binding entity is covalently bound to and within the hydrogel cell through reaction with isocyanate groups.
7. (currently amended) The biochip of claim ~~5~~ 6 wherein about 15% or less of the reactive isocyanates in said polymer of said cell have reacted with said binding entities.
8. (original) The biochip of claim 1 wherein with said binding entity comprises DNA, RNA or PNA.
9. (original) The biochip of claim 1 wherein said binding entity comprises an immunoglobulin, an enzyme, a receptor, an enzyme inhibitor, an enzyme substrate, or a peptide.
10. (original) The biochip of claim 9 wherein each said binding entity is immobilized within the hydrogel through an interaction with an intermediate agent.
11. (original) The biochip of claim 1 wherein said binding entity is a protein which is bound to a metal chelate that is immobilized in the hydrogel and constitutes said intermediate agent.

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12. (original) The biochip of claim 11 wherein said protein is bound to said metal chelate through a histidine-containing polypeptide at one terminal of said protein.

13. (original) The biochip of claim 1 wherein said binding entity is immobilized through a first intermediate agent linked to the hydrogel and a second intermediate agent linked to said first intermediate agent.

14. (original) The biochip of claim 13 wherein said first intermediate agent is an antibody and the second intermediate agent is a protein.

15. (original) The biochip of claim 1 wherein the substrate has a plurality of hydrogel cells attached to its surface and wherein different binding entities are immobilized in different hydrogel cells.

16. (original) The biochip of claim 5 wherein said surface has a plurality of wells formed therein.

17. (original) The biochip of claim 1 wherein the substrate is optically transparent and has reactive molecules on its top to which the hydrogel is covalently bound through some of said isocyanate groups of the polymer.

18. (withdrawn) A hydrogel biochip comprising:

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- a) a solid substrate having a top surface;
- b) a plurality of hydrogel cells comprising polyethylene glycol, polypropylene glycol, or copolymers thereof bound to the top surface of said substrate;
- c) intermediate agents immobilized within or upon said hydrogel of said cells; and
- d) different protein binding entities bound to said intermediate agents respectively within at least several of said hydrogel cells by interaction therewith in a manner so that said protein binding entities assume their native conformations.

19-30. (cancelled)

31. (new) A biochip comprising:

- a) a solid substrate having a surface;
- b) at least one optically clear hydrogel cell attached to the surface of the substrate, which hydrogel cell is formed from an isocyanate-functional polymer; and
- c) a protein immobilized within or upon said hydrogel cell, which protein is effective to selectively hybridize to or sequester a target molecule.

32. (new) The biochip of claim 31 wherein the hydrogel comprises polyethylene glycol, polypropylene glycol, or copolymers thereof with urethane linkages to polyisocyanates.

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33. (new) The biochip of claim 32 wherein the hydrogel cell is between about 20  $\mu\text{m}$  and about 100  $\mu\text{m}$  thick.
34. (new) The biochip of claim 31 wherein said protein is covalently bound to and within the hydrogel cell through reaction with isocyanate groups.
35. (new) The biochip of claim 31 wherein with said protein comprises an immunoglobulin.
36. (new) The biochip of claim 31 wherein said protein comprises an enzyme, a receptor, an enzyme inhibitor or an enzyme substrate.
37. (new) The biochip of claim 31 wherein the substrate has a plurality of hydrogel cells attached to its surface and wherein different proteins are immobilized separately in different hydrogel cells.
38. (new) The biochip of claim 31 wherein said protein is immobilized through a first intermediate agent that is covalently bound to isocyanate groups in the hydrogel and a second intermediate agent linked to said first intermediate agent.
39. (new) The biochip of claim 38 wherein said first intermediate agent is an antibody and said second intermediate agent is a protein.

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40. (new) The biochip of claim 38 wherein said intermediate agents comprise biotin and avidin.

41. (new) A biochip comprising:

- a) a solid substrate having a top surface;
- b) a plurality of optically clear hydrogel cells comprising polymers of (i) polyethylene glycol, polypropylene glycol, or copolymers thereof and (ii) polyisocyanates, which cells are bound to the top surface of said substrate;
- c) intermediate agents immobilized within or upon said hydrogel of said cells; and
- d) different protein binding entities bound to said intermediate agents within at least several of said hydrogel cells by interaction therewith in a manner so that said protein binding entities can assume their native conformations.

42. (new) The biochip of claim 41 wherein said hydrogel is a urethane polymer formed from a prepolymer with excess isocyanate groups, and wherein said protein binding entities are bound through pairs of intermediate coupling agents.